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(54) VEHICLE COMMUNICATION SYSTEM

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a vehicle communication system capable of identifying a person who is seated on a vehicle seat.

SOLUTION: A vehicle communication unit selects and sends the password of the (i)th smart card (S220). Respective smart cards verify whether or not the received password meets a password of its own and if they meet each other, the smart card continues to wait for receiving. If they do not meet each other, it shifts to a sleep condition. The vehicle communication unit sends a call signal (S230). The (i)th smart card then receives the call signal, and develops a prescribed response signal to send it to the vehicle communication unit. The vehicle communication unit receives the response signal (S240) and records the receiving level at that time (S250). The operation is repeated until a count value (i) reaches from 1 to a total number N of the smart cards, and the

smart card of the maximum receiving level is selected (270), which is recognized as the smart card being on a driver seat.

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- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.**** shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]

[Claim 1] It is the car communication system equipped with said pocket means of communications and the car side means of communications which performs two-way communication through two or more pocket means of communications which two or more persons carry according to an individual, respectively, and the antenna attached in the car. Car communication system characterized by having a seat relation recognition means to recognize the seat relation which pocket means of communications exists in which seat, based on receiving level when said car side means of communications receives a reply signal through said antenna from said two or more pocket means of communications.

[Claim 2] Said seat relation recognition means is car communication system according to claim 1 which recognizes which pocket means of communications exists in a driver's seat at least.

[Claim 3] It is the car communication system according to claim 1 or 2 with which said antenna is arranged in two or more locations, and said seat relation recognition means recognizes seat relation based on the receiving level of two or more antennas.

[Claim 4] It is the car communication system according to claim 1 to 3 which said two or more pocket means of communications have a password according to individual, respectively, and said car side means of communications transmits the demand signal which requires a reply signal after specifying said password one by one, and receives the reply signal with the this specified password from pocket means of communications.

[Claim 5] An individual humanity news storage means by which associated the individual humanity news which defined how the device arranged in the circumference of a seat would be operated as each of two or more of said pocket means of communications, and it was memorized, Based on the seat relation recognized by said seat relation recognition means, the individual humanity news corresponding to the pocket means of communications related with this seat per predetermined seat is read from said individual humanity news storage means. the car communication system according to claim 1 to 4 characterized by having the device control means which operates the device arranged in the circumference of the seat based on this individual humanity news that carried out reading appearance.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the car communication system equipped with pocket means of communications and car side means of communications.

[0002]

[Description of the Prior Art] In recent years, the system which performs a car side transmitter and two-way communication using the IC card which can be transmitted and received, and which is called a smart card, and performs lock unlocking of a door is developed. That is, if the operator who is carrying the smart card approaches a car, a smart card will receive the demand signal which the car side transmitter is sending continuously. Then, a smart card transmits the reply signal which contains an ID code according to this demand signal, and a car side transmitter will make a door unlocking, if an ID code and a normal code will be collated if this reply signal is received, and both are in agreement. In this case, since an operator does not have to do button grabbing one by one, for example, when both hands are closed by the load, he is useful.

[0003] When it sits on a driver's seat in a place, even if an operator operates nothing, although it is desirable that regulating automatically is carried out to the seat location suitable for the man, or regulating automatically is carried out to the door mirror include angle suitable for the man, the equipment which realizes this is not yet known. Although it is thought that it is necessary to specify the person who sat down to the driver's seat in order to realize this, using an above-mentioned smart card and the two-way communication of a car side transmitter for it is considered as an idea.

[0004] This invention is made in view of the above-mentioned technical problem, and it aims at offering the car communication system which the person who sat down on the car seat can specify.

[0005]

[The means for solving a technical problem and an effect of the invention] In order to solve the above-mentioned technical problem, invention according to claim 1 It is the car communication system equipped with said pocket means of communications and the car side means of communications which performs two-way communication through two or more pocket means of communications which two or more persons carry according to an individual, respectively, and the antenna attached in the car. It is characterized by having a seat relation recognition means to recognize the seat relation which pocket means of communications exists in which seat, based on receiving level when said car side means of communications receives a reply signal through said antenna from said two or more pocket means of communications.

[0006] In the car communication system of this invention, a seat relation recognition means recognizes seat relation based on receiving level when car side means of communications receives a reply signal through an antenna from pocket means of communications. When an antenna is formed near the driver's seat, specifically, it is recognized as the pocket means of communications which sent the reply signal with the highest receiving level among the reply signals received through the antenna from two or more pocket means of communications existing in the driver's seat. Since two or more persons recognize the relation of the pocket means of communications and the seat which are carried according to an individual according to this car communication system, specification of the person who sat down on the seat is attained.

[0007] In the car communication system of this invention, as indicated to claim 2, as for said seat relation recognition means, it is desirable to recognize which pocket means of communications exists in a driver's seat at least. Although you may recognize which pocket means of communications exists in the seat also about the passenger seat or the backseat in addition to a driver's seat, since it is useful when setting automatically the operating environment the man's form, whose liking, etc. specifying the person who sat down to the driver's seat suited, for example, it is desirable.

[0008] In the car communication system of this invention, as indicated to claim 3, said antenna is arranged in two or more locations, and said seat relation recognition means may be constituted so that seat relation may be recognized based on the receiving level of two or more antennas. In this case, the receiving level of two or more antennas is judged synthetically, and since it recognizes which pocket means of communications exists in which seat, it can recognize more correctly.

[0009] In the car communication system of this invention, as indicated to claim 4, one by one, said two or more pocket means of communications have a password according to individual, and said car side means of communications may transmit the demand signal which requires a reply signal after specifying said password, and it may constitute it so that the reply signal from the pocket means of communications of the this specified password may be received. In this case,

since two or more pocket means of communications do not transmit a reply signal at once to the demand signal of a car side communication device, there is no fear of interference and two-way communication can be performed good. In addition, in case the relation between a seat and pocket means of communications is recognized, the relation between a seat and a password may be recognized.

[0010] An individual humanity news storage means by which made the individual humanity news which defined how the device arranged in the circumference of a seat would be operated correspond for said every pocket means of communications, and it was memorized in the car communication system of this invention as indicated to claim 5, Based on the seat relation recognized by said seat relation recognition means, connect with this seat per predetermined seat, and the individual humanity news corresponding to **** pocket means of communications is read from said individual humanity news storage means. it is good also as a configuration equipped with the device control means which operates the device arranged in the circumference of the seat based on this individual humanity news that carried out reading appearance. In this case, the device (for example, device in which a seat order location, a vertical location, the include angle of a back board, etc. are adjusted) arranged in the circumference of a seat so that he might be automatically suited based on individual humanity news, even if it operated nothing when the operator or the fellow passenger was carrying pocket means of communications operates. For this reason, the amenity of an operator or a fellow passenger improves.

[0011]

[Embodiment of the Invention] Below, the suitable operation gestalt of this invention is explained based on a drawing. Drawing 1 is an outline block diagram showing the whole car communication system of this operation gestalt. The car communication system of this operation gestalt is equipped with the 1st - the Nth smart card SC1, ..., SCN (N is the integer) which have an ID code according to individual and in which two-way communication is possible, and this 1st [the] - the Nth smart card SC1, ..., SCN and the car communication link unit 20 that performs two-way communication.

[0012] The 1st - the Nth smart card SC1, ..., SCN are equipped with the communications control section 14 which transmits a signal to the exterior through the transmitting section 13 and the transceiver antenna 11 while two or more persons do the configuration of the IC card held according to an individual, or a key holder and receive the signal from the outside through the transceiver antenna 11 and a receive section 12. As for this communications control section 14, power is supplied from the built-in power source 15. Moreover, each smart cards SC1, ..., SCN have a password according to individual, and the password is memorized by the internal memory which the communications control section 14 does not illustrate.

[0013] The car communication link unit 20 was carried in the car, and it is equipped with the

control unit 25 which transmits a signal to the exterior through the transmitting section 23 and the transmitting antenna 24 while it receives the signal from the outside through a receiving antenna 21 and a receive section 22. This control unit 25 is equipped with CPU, ROM and RAM of the common knowledge which is not illustrated, a counter, etc., inputs seat positional information, the Miller positional information, steering positional information, etc. from various sensors through an input circuit 26, and outputs a control signal to the various devices arranged in the circumference of seats, such as the seat centering-control device 32, the Miller centering-control device 33, and the steering centering-control device 34, through the output circuit 27. Two or more (here two) receiving antennas 21 of the car communication link unit 20 are formed in the step space of the driver's seat of a car, and point to the operator, respectively. In addition, a receiving antenna 21 may be formed in head lining in the car near the pillar near the room mirror etc.

[0014] The driver's seat of a car is the electric sheet of the common knowledge which can adjust electrically by switch actuation before and after going up and down a seat, or can adjust a back board at a suitable include angle, and the seat positional information after the completion of switch actuation is outputted to the control unit 25 of the car communication link unit 20 by the sensor which is not illustrated. A door mirror is electric Miller who can adjust at a suitable include angle electrically by switch actuation, and the Miller positional information after the completion of switch actuation is outputted to a control unit 25 by the sensor which is not illustrated. A steering cannot adjust whenever [tilt angle] etc. electrically by switch actuation, and the steering information after the completion of actuation is outputted to a control unit 25 by the sensor which is not illustrated.

[0015] Next, actuation of this car communication system is explained. If the registration mode switch which the car communication link unit 20 does not illustrate is turned on, a control unit 25 will perform registration processing shown in drawing 2 . That is, in step (it is called Following S) 110, the seat relation recognition routine (refer to drawing 3) as a subroutine is performed first. As shown in drawing 3 , first, counted value i of a counter is set to "1" in S210, in S220 continuing, the password of the i-th smart card SCi is chosen, and this is transmitted. If it collates whether the received password and the self password of each smart cards SC1-SCN correspond, both are in agreement and both are not [reception is stood by succeedingly and] in agreement, it shifts to sleeping. Thereby, the car communication link unit 20 becomes possible [communicating only with the i-th smart card SCi with the password transmitted by S220], and fear of interference is canceled.

[0016] Then, a control device 25 transmits ringing for making the reply signal for a receiving level check transmit to the i-th smart card SCi in S230. Then, the i-th smart card SCi receives this ringing, creates a predetermined reply signal, and transmits to the car communication link

unit 20. In S240, a control unit 25 receives this reply signal through a receiving antenna 21 and a receive section 22, and records the receiving level at that time on an internal memory (for example, RAM) in S250 continuing. In addition, even if it carries out predetermined time progress, when a reply signal does not return, receiving level is recorded as zero.

[0017] In S260 continuing, counted value i judges whether it is the total N of a smart card, and if counted value i is not Total N (it is NO at S260), after progressing to S265 and incrementing counted value i , processing not more than S220 is repeated again. On the other hand, if counted value i is Total N (it is YES at S260), it will progress to S270 and the smart card (let this be the j -th smart card SC_j in addition integer of either $j1-N$) of the greatest receiving level will be elected among the receiving level recorded on the internal memory of a control device 25. In S280 continuing, the j -th smart card SC_j elected by doing in this way recognizes it as what exists in the driver's seat, and performs related attachment by the j -th smart card SC_j and the driver's seat. At this time, related attachment by the password of the j -th smart card SC_j and the driver's seat may be performed. Consequently, a control unit 25 recognizes the seat relation which smart card exists in a driver's seat.

[0018] A control unit 25 judges after that whether the register operation of individual humanity news was made in S120 of [drawing 2](#). With this operation gestalt, the register operation of individual humanity news says the thing of the actuation which turns on a registration mode switch again, after those who sat down to the driver's seat perform justification of a driver's seat, Miller, or a steering. If the register operation of individual humanity news is not made (it is NO at S120), it stands by as it is and register operation is made in S120 (it is YES at S120), it will progress to S130, seat positional information inputted from the input circuit 26, the Miller positional information, and steering positional information will be made into individual humanity news, and the j -th smart card SC_j related with the driver's seat and this individual humanity news will be matched and memorized. In addition, in case individual humanity news and the j -th smart card SC_j are matched, individual humanity news and the password of the j -th smart card SC_j may be matched. A control unit 25 relates individual humanity news with the j -th smart card SC_j as mentioned above, and it memorizes to an internal memory.

[0019] Next, the case where those who own the smart card of normal operate is explained. When this person sits down to the driver's seat of a car, the taking-a-seat switch which is not illustrated when weight is applied to a driver's seat is turned on. Then, the control device 25 of the car communication link unit 20 performs automatic setting processing shown in [drawing 4](#). That is, in S310, the seat relation recognition routine (finishing [refer to [drawing 3](#) and explanation]) as a subroutine is performed, and the seat relation which smart card exists in a driver's seat is recognized. Let the smart card at this time be the k -th smart card SC_k (integer of either $k1-N$). In S320 continuing, the individual humanity news corresponding to the k -th smart

card SCK is read from an internal memory, and delivery, a seat location, the Miller location, and a steering location are adjusted for a control signal to each regulatory mechanisms 32, 33, and 34 in S330 continuing according to the seat positional information included in the individual humanity news, the Miller positional information, and steering positional information. Consequently, each regulatory mechanisms 32, 33, and 34 arranged in the circumference of that seat based on the individual humanity news memorized beforehand operate, and it is automatically set by the environment which those who sat down to the driver's seat tend to operate. Then, an operator starts an engine and starts operation.

[0020] According to the car communication system of this operation gestalt explained in full detail above, it recognizes which smart card exists in a driver's seat based on receiving level when the control device 25 of the car communication link unit 20 receives a reply signal through a receiving antenna 21, and since each smart card is what two or more persons own according to an individual, respectively, specification of the person who sat down to the driver's seat is attained.

[0021] Moreover, since an operator is set by the operating environment which suited itself automatically only by bringing one's smart card and sitting down to a driver's seat, amenity improves. Furthermore, since the receiving antenna 21 is arranged so that it may point to an operator in two or more locations, it can recognize more correctly which smart card exists in a driver's seat.

[0022] Furthermore, two or more smart cards have a password according to individual, respectively, and one by one, the car communication link unit 20 transmits ringing which requires a reply signal after specifying a password, since it receives the reply signal from the smart card of the specified password, two or more smart cards do not transmit a reply signal at once to ringing of the car communication link unit 20, and it does not have fear of interference, and can perform two-way communication good again.

[0023] It sets in this above operation gestalt, the 1st - the Nth smart card SC1-SCN are equivalent to two or more pocket means of communications of this invention, the control unit 25 of the car communication link unit 20 is equivalent to the car side means of communications of this invention, a seat relation recognition means, and a device control means, and the internal memory of a control unit 25 is equivalent to an individual humanity news storage means.

[0024] In addition, as long as the gestalt of operation of this invention is not limited to the above-mentioned operation gestalt at all and belongs to the technical range of this invention, it cannot be overemphasized that various gestalten can be taken. For example, in the above-mentioned operation gestalt, a receiving antenna may be installed also about a passenger seat or a backseat in addition to a driver's seat, it may recognize which smart card exists about each seat, and the regulatory mechanism of the circumference of each seat may be automatically

set based on the individual humanity news corresponding to the smart card. For example, when those who sit down to a passenger seat are small children, you may constitute so that the air bag of a passenger seat may become non-operative.

[0025] Moreover, in case it recognizes which smart card exists about each seat, an antenna is formed in each seat or its near, the receiving level in each seat is compared for every smart card, and the seat where receiving level is the highest, and its smart card may be associated. For example, when the receiving level in each seat per 1st smart card is a passenger seat > driver's seat > backseat, the 1st smart card and a passenger seat are associated.

[0026] Furthermore, each smart card may have an ID code according to individual for lock unlocking of a door. In this case, if those who carried the smart card of the normal into which the ID code is registered as a regular code approach a car, this smart card will receive the demand signal which the car communication link unit is sending continuously from the door side of a driver's seat. In addition, a demand signal is a signal which requires the reply signal containing an ID code. The smart card which received this demand signal transmits the reply signal which contains an ID code according to this demand signal. If this reply signal is received and both are [an ID code and a normal code are collated and] in agreement, a car communication link unit will output a control signal to a door-lock device, and will make a door unlocking. On the other hand, if a smart card pocket person separates distantly, a car communication link unit cannot receive a reply signal, but a door is locked if this is checked. In case said demand signal may be used as ringing, and said reply signal may be used as a reply signal and a seat or individual humanity news, and a smart card are matched in S280 of S130 of [drawing 2](#) , or [drawing 3](#) , you may make it match a seat or individual humanity news, and the ID code of a smart card, although each processing is performed along with the flow chart of [drawing 2](#) - [drawing 4](#) like the above-mentioned operation gestalt also in this case.

[0027] Furthermore, when the maximum of the recorded receiving level has not reached predetermined level (level for distinguishing a reply signal, a noise, etc.) in S270 again, it judges that he has no corresponding smart card, and you may make it report that. As such a case, the time of the built-in power source of a smart card having been exhausted nearly completely, for example etc. is mentioned.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is an outline block diagram showing the whole car communication system of this operation gestalt.

[Drawing 2] It is a flow chart showing registration processing.

[Drawing 3] It is a flow chart showing seat relation recognition processing.

[Drawing 4] It is a flow chart showing automatic setting processing.

[Description of Notations]

11 ... a transceiver antenna and 12 ... a receive section and 13 ... the transmitting section and 14 ... the communications control section and 15 ... a built-in power source and 20 ... a car communication link unit and 21 ... a receiving antenna and 22 ... a receive section and 23 ... the transmitting section and 24 ... a transmitting antenna and 25 ... a control unit and 26 ... an input circuit and 27 ... an output circuit and 32 ... a seat centering-control device and 33 ... the Miller centering-control device and 34 ... a steering centering-control device, and SC1-SCN ... -- the 1st - the Nth smart card.

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